

Appl. No. 10/502,110

Attorney Docket No. 10555-085

**I. Listing of Claims**

1. (Original) A planar avalanche photodiode comprising:  
an n-type semiconductor layer defining a contact area;  
a semiconductor layer having a p-type diffusion region, the p-type diffusion region having a smaller area than the semiconductor layer;  
a semiconductor multiplication layer;  
a semiconductor absorption layer; and  
a p-type contact layer;  
wherein the p-type diffusion region is disposed directly adjacent to the p-type contact layer and the semiconductor absorption layer is disposed between the semiconductor multiplication layer and the semiconductor layer with the p-type diffusion region.
2. (Original) The planar avalanche photodiode of claim 1 further comprising at least one grading layer disposed adjacent to the semiconductor absorption layer.
3. (Original) The planar avalanche photodiode of claim 1 further comprising a p-type semiconductor charge control layer disposed adjacent to the semiconductor multiplication layer.
4. (Original) The planar avalanche photodiode of claim 1 further comprising at least one n-type contact layer.
5. (Original) The planar avalanche photodiode of claim 1 wherein the n-type semiconductor layer is InAlAs.
6. (Original) The planar avalanche photodiode of claim 1 wherein the semiconductor layer with the p-type diffusion layer is InAlAs.
7. (Original) The planar avalanche photodiode of claim 1 wherein the semiconductor multiplication layer is InAlAs.



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8. (Original) The planar avalanche photodiode of claim 1 wherein the semiconductor absorption layer is InGaAs.

9-19. (Cancelled)

20. (Currently Amended) [[The]] A planar avalanche photodiode of claim 19 further comprising:

an n-type semiconductor layer defining a contact area;  
a semiconductor multiplication layer;  
a semiconductor absorption layer, the semiconductor multiplication layer being disposed between the first n-type semiconductor layer and the semiconductor absorption layer;

a p-type semiconductor contact layer having a smaller area than the absorption layer, the semiconductor absorption layer being disposed between the semiconductor multiplication layer and the p-type semiconductor contact layer;

wherein the photodiode has a low field region near the p-type semiconductor contact layer and a low capacitance at least one grading layer disposed adjacent to the semiconductor absorption layer; and

at least one grading layer disposed adjacent to the semiconductor absorption layer.

21. (Currently Amended) The planar avalanche photodiode of claim [[19]] 20 further comprising a p-type semiconductor charge control layer disposed adjacent to the semiconductor multiplication layer.

22. (Currently Amended) The planar avalanche photodiode of claim [[19]] 20 wherein the n-type semiconductor layer is InAlAs.

23. (Currently Amended) The planar avalanche photodiode of claim [[19]] 20 wherein the semiconductor multiplication layer is InAlAs.



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24. (Currently Amended) The planar avalanche photodiode of claim [[19]] 20 wherein the semiconductor absorption layer is InGaAs.

25. (Currently Amended) The planar avalanche photodiode of claim [[19]] 20 wherein the p-type semiconductor contact layer is InAlAs.

26. (Currently Amended) [[The]] A planar avalanche photodiode ~~of the claim 19~~ further comprising:

an n-type semiconductor layer defining a contact area;

a semiconductor multiplication layer;

a semiconductor absorption layer, the semiconductor multiplication layer being disposed between the first n-type semiconductor layer and the semiconductor absorption layer;

a p-type semiconductor contact layer having a smaller area than the absorption layer, the semiconductor absorption layer being disposed between the semiconductor multiplication layer and the p-type semiconductor contact layer;

wherein the photodiode has a low field region near the p-type semiconductor contact layer and a low capacitance at least one grading layer disposed adjacent to the semiconductor absorption layer; and

a passivated region including a semiconductor layer disposed between the p-type contact layer and the semiconductor absorption layer.

27. (Original) The planar avalanche photodiode of claim 26 wherein the passivated region includes a portion of a first grading layer and a portion of the semiconductor absorption and multiplication layers.



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